FLIGHT SUMMARY REPORT

Flight Number: 99-003-04

Calendar/Julian Date: 1 May 1999 • 121

Sensor Package: Wild Heerbrugg RC-30
MASTER Airborne Simulator (MASTER)

Area(s) Covered: Puertecitos, Baja Mexico (Site #970)

Investigator(s): Stock, Caltech

Aircraft #: 798
Department of Energy
King Air B200

SENSOR DATA

Accession #:	05335	-----
Sensor ID #:	126	124
Sensor Type:	RC-30	MASTER
Focal Length:	6” 153.21mm	-----
Film Type:	Aerochrome IR SO-134	-----
Filtration:	Wratten 12 + 2.2 AV	-----
Spectral Band:	510-900nm	-----
f Stop:	Variable	-----
Film Speed:	Variable	-----
# of Frames:	24	-----
% Overlap:	Variable	-----
Quality:	Excellent	-----

Remarks:

Airborne Science Program

The Airborne Science Program at NASA's Dryden Flight Research Center, Edwards, California, operates two ER-2 high altitude aircraft in support of NASA earth science research. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and in situ data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

Department of Energy Remote Sensing Laboratory

The NASA Airborne Science Program at Dryden Flight Research Center and Ames Research Center contracted with the Department of Energy Remote Sensing Laboratory (RSL) in Las Vegas, Nevada to acquire remote sensing data with the DOE King Air B-200 aircraft.

The DOE King Air B-200 is a low and medium altitude, moderate speed aircraft. It can operate from 4,000 to 35,000 feet above sea level at speeds between 135 and 225 knots. There are two instrument ports in the aircraft. The NASA MASTER Scanner was mounted over the forward port and the DOE Wild Heerbrugg RC-30 Mapping Camera was mounted over the aft port.

Camera Systems

Various camera systems and films are used for photographic data collection. Film types include high definition color infrared, natural color, and black and white emulsions. Available photographic systems are as follows:

- Wild-Heerbrugg RC-10/RC-30 metric mapping camera
  - 9 x 9 inch film format
  - 6 inch focal length lens provides area coverage of 16 x 16 nautical miles from 65,000 feet
  - 12 inch focal length lens provides area coverage of 8 x 8 nautical miles from 65,000 feet

- Hycon HR-732 large scale mapping camera
  - 9 x 18 inch film format
  - 24 inch focal length lens provides area coverage of 4 x 8 nautical miles from 65,000 feet

- IRIS II Panoramic camera
  - 4.5 x 34.7 inch film format
  - 24 inch focal length lens
  - 90 degree field of view provides area coverage of 2 x 21.4 nautical miles from 65,000 feet

MASTER (MODIS/ASTER Airborne Simulator)

The MASTER is similar to the MAS, with the thermal bands modified to more closely match the NASA EOS ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) satellite instrument, which is scheduled for launch in 1998. It is intended primarily to study geologic and other Earth surface properties. Flying on both high and low altitude aircraft, the MASTER became operational in early 1998. Its fifty spectral bands are configured as follows:

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
1	0.460	0.04	0.440-0.480
2	0.500	0.04	0.480-0.520
3	0.540	0.04	0.520-0.560
4	0.580	0.04	0.560-0.600
5	0.660	0.06	0.630-0.690
6	0.710	0.04	0.690-0.730
7	0.750	0.04	0.730-0.770
8	0.800	0.04	0.780-0.820
9	0.865	0.04	0.845-0.885
10	0.905	0.04	0.885-0.925
11	0.945	0.04	0.925-0.965
12	1.625	0.05	1.600-1.650
13	1.675	0.05	1.650-1.700
14	1.725	0.05	1.700-1.750
15	1.775	0.05	1.750-1.800
16	1.825	0.05	1.800-1.850
17	1.875	0.05	1.850-1.900
18	1.925	0.05	1.900-1.950
19	1.975	0.05	1.950-2.000
20	2.075	0.05	2.050-2.100
21	2.160	0.05	2.135-2.185
22	2.210	0.05	2.185-2.235
23	2.260	0.05	2.235-2.285
24	2.3295	0.065	2.297-2.362
25	2.3945	0.065	2.362-2.427

Spectral Channel	Band center (µm)	Bandwidth (µm)	Spectral Range
26	3.150	0.15	3.075-3.225
27	3.300	0.15	3.225-3.375
28	3.3450	0.15	3.375-3.525
29	3.600	0.15	3.525-3.675
30	3.750	0.15	3.675-3.825
31	3.900	0.15	3.825-3.975
32	4.050	0.15	3.975-4.125
33	4.200	0.15	4.125-4.275
34	4.575	0.6	4.275-4.875
35	4.500	0.15	4.425-4.575
36	4.650	0.15	4.575-4.725
37	4.800	0.15	4.725-4.875
38	4.950	0.15	4.875-5.025
39	5.100	0.15	5.025-5.175
40	5.250	0.15	5.175-5.325
41	7.900	0.4	7.70-8.10
42	8.300	0.4	8.10-8.50
43	8.700	0.4	8.50-8.90
44	9.100	0.4	8.90-9.30
45	9.700	0.4	9.50-9.90
46	10.100	0.4	9.90-10.30
47	10.625	0.65	10.30-10.95
48	11.300	0.7	10.95-11.65
49	12.050	0.5	11.80-12.30
50	12.750	0.5	12.50-13.00

Sensor/Aircraft Parameters:

Spectral Bands:	50 (16-bit resolution)
IFOV:	2.5 mrad
Swath width:	19.9 nmi (36 km) at 65,000 ft
Ground Resolution:	12-50 meters (variable w/ altitude)
Total FOV:	85.92 degrees

Pixels/Scanline:	716
Scan Rate:	6.25 - 25 Hz

(See the homepage at asterweb.jpl.nasa.gov)

Information on data tape format, logical record format, and scanner calibration data may be obtained from the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 650-604-6252).

Data Availability

The U.S. Geological Survey's EROS Data Center at Sioux Falls, South Dakota serves as the archive and product distribution facility for Airborne Science Program aircraft acquired photographic and digital imagery. The photographic archive consists of photography acquired by the program from 1971 to April 1996. For information regarding photography and digital data (including areas of coverage, products, and product costs) contact EROS Data Center, Customer Services, Sioux Falls, South Dakota 57198 (Telephone: 605-594-6151).

As of April 1996 the EROS Data Center no longer receives an archive copy of newly acquired Airborne Science Program photography. Original photography is archived with the Airborne Sensor Facility at Ames Research Center. A user copy of the photography is provided to the principal investigators for each flight. Principal investigators are cited on the first page of their respective flight summary reports. For information regarding photography acquired from April 1996 to the present contact the Airborne Sensor Facility as follows:

Flight Documentation and Data Archive Searches

The following is the web site for flight documentation as published by the Airborne Sensor Facility at NASA Ames Research Center:

http://asapdata.arc.nasa.gov/er-2fsr.html

Additional information regarding flight documentation to include data archive searches, data availability, sensor parameters, and areas of coverage may be obtained from the following:

Airborne Sensor Facility
MS 240-6
NASA Ames Research Center
Moffett Field, CA 94035-1000
Telephone: (650)604-6252 (FAX 4987)

MODIS/ASTER AIRBORNE SIMULATOR (MASTER) FLIGHT LINE INFORMATION FOR 01-MAY-1999
NASA FLIGHT NUMBER 99-003-04

				START OF FLIGHT LINE			END OF FLIGHT LINE			FLIGHT DATA				
FILE	SITE	LINE	RUN	TIME HH:MM:SS	LAT DEG	LON DEG	TIME HH:MM:SS	LAT DEG	LON DEG	SCAN LINES	SOLAR ZEN	SOLAR AZIM	HEAD DEG	ALT M (GPS)
1	970	7	1	18:10:08	29.647	-114.369	18:14:30	29.853	-114.459	6517	23.9	123.4	348.09	2386
2	970	7	1	18:14:31	29.854	-114.459	18:18:53	30.063	-114.550	6518	23.3	125.4	347.62	2389
3	970	7	1	18:18:54	30.063	-114.550	18:23:16	30.272	-114.641	6517	22.8	127.5	347.01	2388
4	970	7	1	18:23:17	30.272	-114.641	18:27:38	30.481	-114.731	6516	22.2	129.7	347.23	2385
5	970	7	1	18:27:40	30.482	-114.732	18:28:58	30.544	-114.759	1941	21.9	131.2	347.26	2385
6	970	6	1	18:31:50	30.549	-114.785	18:36:11	30.333	-114.692	6516	20.9	133.8	166.58	2388
7	970	6	1	18:36:13	30.333	-114.691	18:40:35	30.115	-114.597	6515	20.0	136.0	167.26	2390
8	970	6	1	18:40:36	30.114	-114.596	18:44:58	29.895	-114.501	6516	19.2	138.3	167.76	2389
9	970	6	1	18:44:59	29.894	-114.501	18:49:21	29.675	-114.406	6511	18.3	140.8	168.21	2392
10	970	6	1	18:49:22	29.675	-114.405	18:49:58	29.644	-114.392	920	17.9	142.3	166.52	2393
11	970	5	1	18:53:09	29.632	-114.411	18:57:31	29.832	-114.498	6516	17.2	146.2	348.12	2391
12	970	5	1	18:57:32	29.833	-114.498	19:01:54	30.033	-114.585	6515	16.9	149.5	347.43	2391
13	970	5	1	19:01:55	30.034	-114.585	19:06:17	30.236	-114.673	6513	16.7	152.8	347.69	2391
14	970	5	1	19:06:18	30.237	-114.673	19:10:40	30.441	-114.762	6512	16.5	156.3	347.60	2394
15	970	5	1	19:10:41	30.442	-114.762	19:12:09	30.511	-114.792	2189	16.4	158.6	347.01	2391
16	970	4	1	19:15:27	30.531	-114.825	19:19:49	30.320	-114.733	6509	15.9	163.6	166.87	2390
17	970	4	1	19:19:50	30.319	-114.733	19:24:12	30.103	-114.639	6513	15.5	167.5	167.37	2391
18	970	4	1	19:24:13	30.102	-114.639	19:28:35	29.886	-114.545	6512	15.1	171.7	167.96	2390
19	970	4	1	19:28:36	29.885	-114.544	19:32:58	29.667	-114.450	6514	14.7	176.1	167.54	2390
20	970	4	1	19:32:59	29.666	-114.450	19:33:37	29.634	-114.436	946	14.6	178.6	166.69	2392

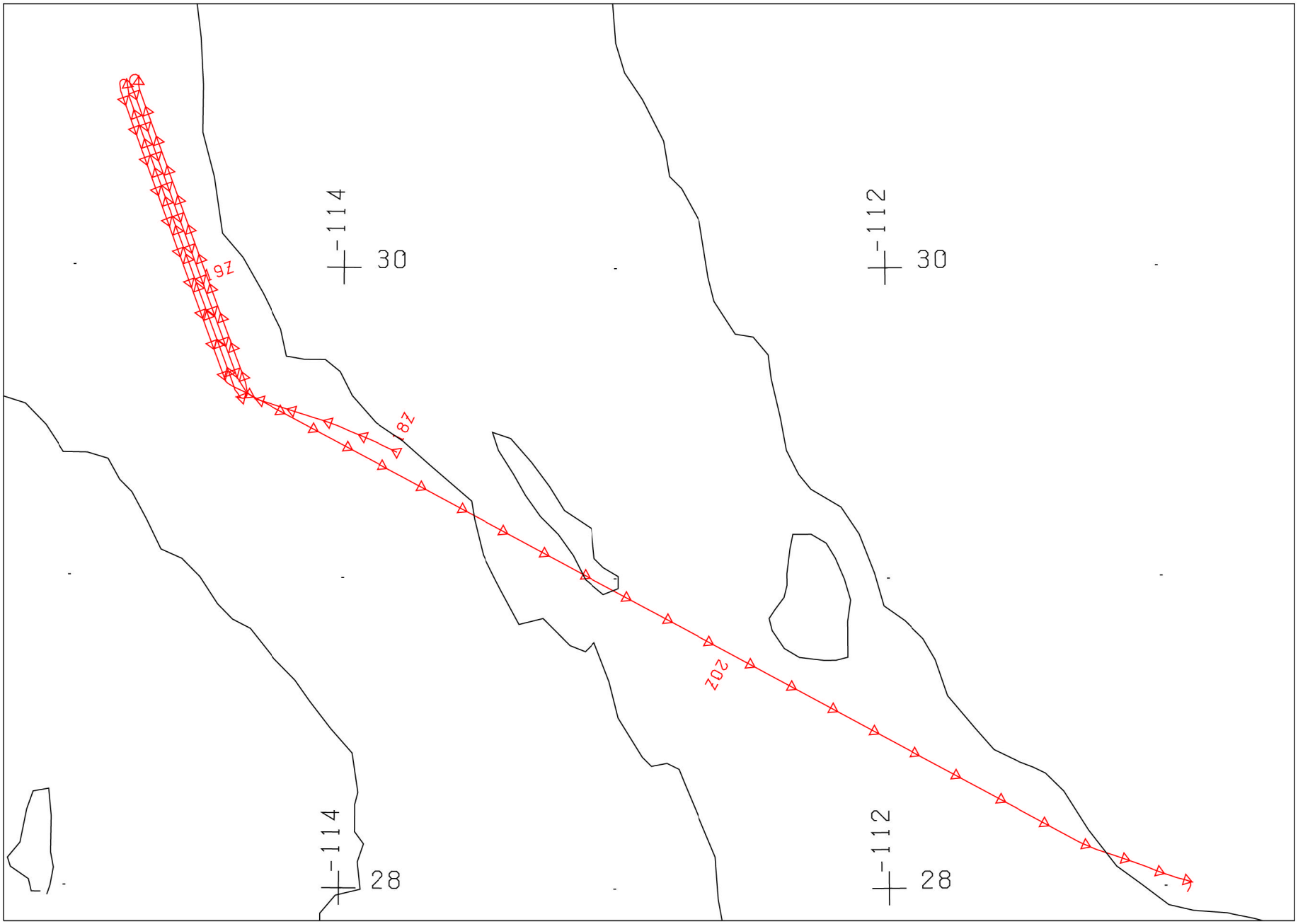
NUMBER OF FILES FOR THIS FLIGHT = 20
TOTAL NUMBER OF SCAN LINES = 110226
DATE THESE FILES WERE PROCESSED = 25-Aug-99
DATE THIS LIST WAS CREATED = 27-Aug-99
GRANULE VERSION = 9

CAMERA FLIGHT LINE DATA
FLIGHT NO. 99-003-04

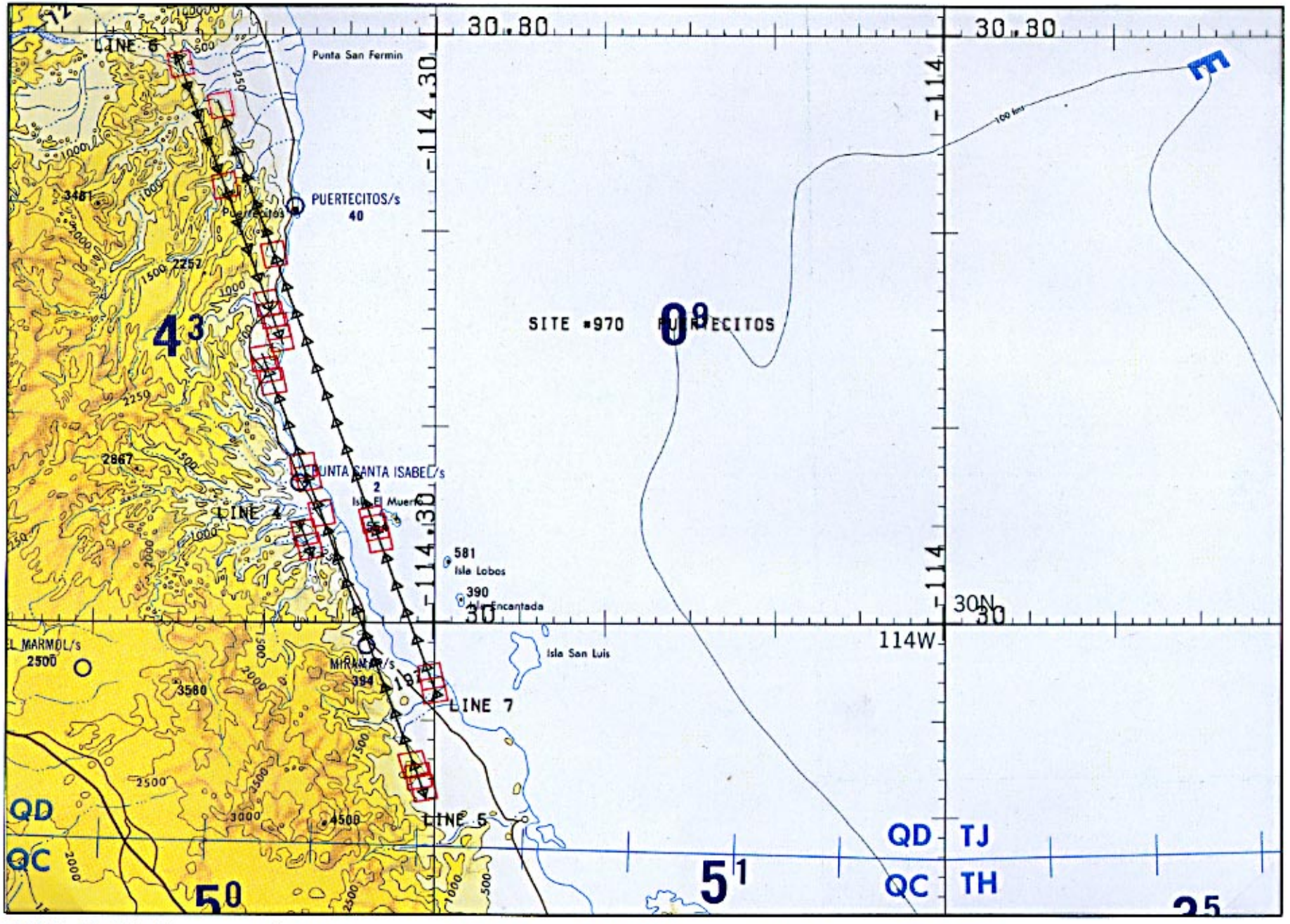
Accession # 05335

Sensor # 126

Site #	Line #	Run #	Frame #	Time (GMT-hr, min, sec) START	Time (GMT-hr, min, sec) END	Altitude, MSL feet/meters	Cloud Cover/Remarks
970	7	1	0001-0007	18:16:31	18:26:53	7800/2380	Clear
970	6	1	0008-0013	18:33:27	18:38:14	7800/2380	Clear
970	5	1	0014-0022	18:58:13	19:06:10	7800/2380	Clear
970	4	1	0023-0024	19:24:56	19:25:09	7800/2380	Clear



FLIGHT 99-003-04 1 MAY 1999 A/C 798 (DOE B200) MASTER / RC-30



FLIGHT 99-003-04 1 MAY 1999 A/C 798 (DOE B200) RC-30 TPC H-22B